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<b>UTILITY PATENT APPLICATION TRANSMITTAL</b> <small>(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))</small>	Attorney Docket No.	470AM
	First Inventor or Application Identifier	Johansen
	Title	Multiple Layer Polymeric Cap...
	Express Mail Label No.	EL345389782US

<b>APPLICATION ELEMENTS</b> See MPEP chapter 600 concerning utility patent application contents.	<b>ADDRESS TO:</b> Assistant Commissioner for Patents Box Patent Application Washington, DC 20231
1. <input checked="" type="checkbox"/> * Fee Transmittal Form (e.g., PTO/SB/17) (Submit an original and a duplicate for fee processing)	5. <input type="checkbox"/> Microfiche Computer Program (Appendix)
2. <input checked="" type="checkbox"/> Specification [Total Pages 15] (preferred arrangement set forth below) - Descriptive title of the invention - Cross References to Related Applications - Statement Regarding Fed sponsored R & D - Reference to Microfiche Appendix - Background of the invention - Brief Summary of the invention - Brief Description of the Drawings (if filed) - Detailed Description - Claim(s) - Abstract of the Disclosure	6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary) a. <input type="checkbox"/> Computer Readable Copy b. <input type="checkbox"/> Paper Copy (identical to computer copy) c. <input type="checkbox"/> Statement verifying identity of above copies
3. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Sheets 2]	<b>ACCOMPANYING APPLICATION PARTS</b>
4. Oath or Declaration [Total Pages 4] a. <input checked="" type="checkbox"/> Newly executed (original or copy) b. <input type="checkbox"/> Copy from a prior application (37 C.F.R. § 1.63(d)) (for continuation/divisional with Box 16 completed) i. <input type="checkbox"/> DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).	7. <input checked="" type="checkbox"/> Assignment Papers (cover sheet & document(s)) 8. <input type="checkbox"/> 37 C.F.R. § 3.73(b) Statement of Power of Attorney (when there is an assignee) 9. <input type="checkbox"/> English Translation Document (if applicable) 10. <input type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449 [Copies of IDS Citations] 11. <input type="checkbox"/> Preliminary Amendment 12. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) (Should be specifically itemized) 13. <input type="checkbox"/> * Small Entity Statement filed in prior application, Status still proper and desired (PTO/SB/09-12) 14. <input type="checkbox"/> Certified Copy of Priority Document(s) (if foreign priority is claimed) 15. <input checked="" type="checkbox"/> Other: Power of Attorney

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16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. \_\_\_\_\_ / \_\_\_\_\_

Prior application information. Examiner \_\_\_\_\_ Group / Art Unit: \_\_\_\_\_

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June 29, 2000

Box New Patent Application  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Enclosed herewith for filing is a new patent application entitled

MULTIPLE LAYER POLYMERIC CAP AND METHOD OF MAKING THE SAME

This application is being filed pursuant to the revised Rules of Practice effective February 27, 1983 by the undersigned attorney of the applicant. It is respectfully requested that this application be assigned a filing date of June 29, 2000 pursuant to the "Express Mail" (EL345389782US) provision of 37 C.F.R. § 1.10 as amended.

The name and addresses of the inventors of the subject matter of the enclosed patent application are as follows:

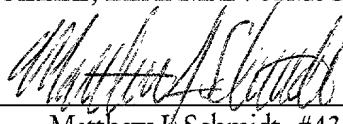
Mark A. Johansen  
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Please forward to the undersigned attorney all correspondence in connection with this application. We await receipt of a filing date and serial number for this application.

Respectfully submitted,

REISING, ETHINGTON, BARNES,  
KISSELLE, LEARMAN & McCULLOCH, P.C.

By



Matthew J. Schmidt, #43,904

MJS/tw  
Enclosures

## **MULTIPLE LAYER POLYMERIC CAP AND METHOD OF MAKING THE SAME**

### **Field of the Invention**

This invention relates generally to polymeric containers and more particularly to a cap for a polymeric container and a method of making it.

### **Background of the Invention**

Environmental concerns and regulations have spurred the need to reduce the amount of hazardous hydrocarbon vapors emitted by vehicles and have led to the development of new technologies for manufacturing plastic fuel tanks. A fuel tank constructed from a single layer of a plastic, such as high density polyethylene, has been found to have an unacceptably high permeation rate of fuel vapor therethrough. Therefore, current plastic fuel tanks are formed with multiple layers one of which is a vapor barrier layer and these tanks have reduced the amount of hydrocarbons released into the atmosphere by as much as 60 times over single layer untreated plastic fuel tanks.

A typical multi-layerlayer plastic fuel tank construction comprises an outer layer of high density polyethylene, an inner layer of high density polyethylene, and a vapor barrier layer disposed between them. The vapor barrier layer is typically a polymer such as ethylene vinyl alcohol which requires an adhesive layer adjacent both the outer and inner layers to join the high density polyethylene with the ethylene vinyl alcohol. A multi-layerlayer plastic fuel tank is substantially more difficult to manufacture than a

single layer plastic fuel tank and is usually made by a multi-layer extrusion and blow molding process.

Previously, a separate monolayer cap, or a separate multiple layer cap formed by a separate molding process, such as injection molding, has been provided to cover each opening into the fuel tank. Undesirably, the monolayer cap permits fuel vapor to permeate therethrough and the separate molding process to provide a multiple layer cap is relatively costly and time consuming to perform.

### **Summary of the Invention**

A cap is formed from the flash of a molded polymeric article. Desirably, the material of the flash, and hence the cap, has the same properties as the molded article.

In one embodiment, the molded article is a multi-layer plastic fuel tank having a vapor barrier layer sandwiched between structural and/or adhesive layers and the cap has the same general construction and may be fixed or welded to the fuel tank over an opening through the tank. Advantageously, the cap is formed in the same process used to form the molded article and reduces the scrap or waste material by utilizing a portion of the flash which is removed from the molded article after it is formed. Therefore, the cost and time to produce a molded article and one or more caps is greatly reduced.

Objects, features and advantages of this invention include providing a cap which does not require any secondary molding operations, is formed in flash from a molded article to reduce the scrap or waste material of the molded article, is formed simultaneously with the molded article, may have the same construction and

characteristics of the molded article, reduces the time and cost to form a cap and molded article, is ideally suited to forming a multi-layer cap for a polymeric fuel tank which may be welded to the fuel tank and which limits the permeation of fuel vapor through the cap, is of relatively simple design and economical manufacture and assembly, and has a long useful life in service.

### **Brief Description of the Drawings**

These and other objects, features and advantages of this invention will be apparent from the following detailed description of the preferred embodiment and best mode, appended claims and accompanying drawings in which:

FIG. 1 is a plan view of a molded polymeric fuel tank having flash sections adapted to provide a plurality of caps in accordance with the present invention;

FIG. 2 is a cross sectional view of the fuel tank of FIG. 1 received between a pair of open die halves of a blow molding machine;

FIG. 3 is a diagrammatic sectional view illustrating a cap formed according to the present invention fixed to a polymeric fuel tank;

FIG. 4 is an enlarged fragmentary view of the encircled portion 4 in FIG. 2;

FIG. 5 is an enlarged fragmentary view of the encircled portion 5 of FIG. 2;

FIG. 6 is a diagrammatic sectional view of a pair of die halves which may be used to form a fuel tank according to the present invention; and

FIG. 7 is a diagrammatic sectional view of a pair of modified die halves which may be used to form a fuel tank according to the present invention.

### **Detailed Description of the Preferred Embodiment**

Referring in more detail to the drawings, FIGS. 1 – 3 show a multi-layerlayer molded plastic fuel tank 10 as is commonly used, for example, in the automotive industry. As shown in FIG. 4, the walls 11 of the fuel tank 10 preferably have inner 12 and outer 14 layers formed primarily of polyethylene and an intermediate vapor barrier layer 16 formed of a copolymer such as ethylene vinyl alcohol to reduce the permeation of fuel vapor through the fuel tank 10. The tank walls 11 may be formed by coextruding a parison of the various layers of different materials and blow molding the parison to form the fuel tank. The plastic fuel tanks 10 are particularly desirable because of their light weight, resistance to corrosion, ease of manufacturing and low fuel vapor permeation characteristics.

As shown in FIG. 4, the fuel tank 10 has multiple layers including: an outer layer 14 of high density polyethylene (HDPE) which may also have some carbon black or poly black mixed therein to provide coloration; an outer adhesive layer 24; the vapor barrier layer 16; an inner adhesive layer 26; and an inner layer 12 of virgin high density polyethylene. The vapor barrier layer 16 is preferably ethylene vinyl alcohol (EVOH) and the adhesive layers may be of a wide variety of materials with one current example sold under the trade name ADMER by Evalca, Inc. The inner and outer adhesive layers 24, 26 are necessary to attach the adjacent layers of HDPE to the vapor

barrier layer 16 and thereby increase the structural integrity of the fuel tank 10 which is paramount for passing various crush resistance and vehicle crash specifications in the automotive industry. The vapor barrier layer 16 is necessary to reduce the amount of hydrocarbon vapors which would diffuse, permeate or otherwise escape through the fuel tank walls 11 which are composed primarily of HDPE.

A typical multi-layer plastic fuel tank wall 11 has a thickness of between about 2.5 mm and 8 mm, with an optimal total wall thickness of about 5 mm. Nominal values for the individual layers of the multi-layer plastic fuel tank 10 are as follows: the outer layer 14 comprises between about 40 to 50 percent of the total wall thickness; the outer adhesive layer 24 comprises between about 1 to 4 percent of the total wall thickness; the vapor barrier layer 16 comprises between about 2 to 5 percent of the total wall thickness; the inner adhesive layer 26 comprises between about 1 to 4 percent of the total wall thickness; and the inner layer 12 comprises between about 40 and 50 percent of the total wall thickness. These ranges of the thickness of the individual layers are illustrative only, and can be readily varied during the coextrusion of the parison for forming the fuel tank walls 11 during the manufacture of the fuel tanks 10.

To form such a fuel tank 10, preferably the various layers are simultaneously extruded into a generally cylindrical parison which is received in a generally molten state between a pair of die halves 30, 32 of a blow molding machine.

When the die halves 30, 32 are closed together they define a main cavity 34 which will provide the desired external shape of the fuel tank 10. After closing the die halves 30, 32 together, a pressurized fluid, such as air, is provided into the interior of the parison

through a blow pin in a conventional manner to outwardly expand the parison into engagement with the mold halves 30, 32. The pressure within the parison is maintained until it has cooled at least sufficiently to hold its shape without collapsing. Thereafter, the formed fuel tank 10 is permitted to further cool and harden.

When the die halves 30, 32 of the blow molding machine are closed around a parison disposed between them, a portion of the parison is pinched or trapped between die halves 30, 32 and these trapped portions of the parison will form flash 36 which is conventionally trimmed or machined off of the formed fuel tank 10. The portions of the parison may be trapped between the die halves 30, 32 to close opposed open ends of the generally cylindrical or tubular parison, and/or to retain the position of the parison within the die halves. So formed, the flash 36 has the same multiple layer construction of the fuel tank 10 and indeed, may have two of each layer due to the pinching of the parison between the mold halves 30, 32. Therefore, desirably, the flash may have two vapor barrier layers.

As shown in FIG. 2, at least one of the die halves 30 is provided with a plurality of projections 38 extending into a gap between the die halves 30, 32 defining a second cavity 39. The projections 38 are constructed and arranged to provide corresponding depressions or recesses 40 in the flash 36. As shown, the recesses 40 are preferably generally circular in cross section and the projections 38 are preferably generally cylindrical with a planar end face and form recesses 40 having a generally flat bottom 42 and a generally cylindrical sidewall 44. As shown in FIG. 6, a second cavity 39' may also be formed between modified die halves 30', 32' having a generally circular



recess 45 in the upper die half 30' and an annular recess 46 in the lower die half 32' to provide a flat bottom and cylindrical sidewall formation in the flash 36. As shown in FIG. 7, each mold half 30", 32" may have a separate circular recess 47, 48, respectively, to define a generally cylindrical second cavity 39" and corresponding portion of the flash 36 which may be severed from the remainder of the flash and used as a cap. Other constructions and arrangements of the mold halves may be used to provide a desired shape or form in the flash 36.

As shown, four recesses 40 are provided with two in each of two flash sections 36 on the formed fuel tank 10, although any number of projections or recesses 40 can be formed. A separate cap 50 is formed by stamping or cutting the flash 36 slightly radially outwardly of each recess 40 such as along the dashed lines 52 shown in FIG. 1. As shown in FIG. 3, a cap 50 may be used to cover an opening 54 of the fuel tank, such as an opening to receive a fuel vapor vent valve 56 and/or a fuel pump module or other component internal to the fuel tank.

Desirably, as shown in FIG. 5, the cap 50 has the multi-layer construction of the fuel tank, and may have two of each layer as described with reference generally to the flash 36, to provide one or more layers of high density polyethylene or similar structural material adjacent to the fuel tank and which may be welded thereto such as by hot plate, ultrasonic or other welding methods. The cap 50 also has at least one and preferably two fuel vapor barrier layers 16 which at least substantially prevent permeation of fuel vapor therethrough to reduce the escape to the atmosphere of hazardous hydrocarbon fuel vapors. In use, various openings 58 may be cut through the cap to

permit the passage of a fuel line, a fuel vapor line, electrical wires and/or other conduits into the fuel tank 10 as needed.

The cap 50 is formed simultaneously with a blow molded article and within flash sections 36 formed during production of the molded article to reduce the overall waste or scrap material and to eliminate the need for secondary processing operations to form the cap 50. Desirably, the cap 50 may be formed from the same material as the blow molded article and thus, may have the multiple layer construction of the blow molded article and the desirable characteristics of each layer and may even have two of each layer of material.

## Claims

1.

1 A method of forming a cap for a container, comprising the steps of:  
2 molding a polymeric container to form the container and a flash section  
3 integral with the container;  
4 forming at least one cap in the flash section; and  
5 separating the cap from the flash section to form a separate cap.

2.

1 The method of claim 1 wherein the molding step comprises blow molding  
2 the container within a mold die having two mold halves with the flash section defined at  
3 least in part between the mold halves.

3.

1 The method of claim 2 wherein at least one of the halves has a projection  
2 adapted to provide a recess in the flash section with the recess defining a portion of the  
3 cap when it is separated from the flash section.

4.

1 The method of claim 1 wherein the container and flash section are formed  
2 from multiple layers of material.

5.

1           The method of claim 1 wherein the container and cap have a vapor barrier  
2 layer disposed between inner and outer layers of a different material.

6.

1           A fuel tank, comprising:

2           a tank wall formed from multiple layers of polymeric material including at  
3 least one structural layer and at least one vapor barrier layer, at least one flash section to  
4 be removed from the tank wall, and an opening through the tank wall; and

5           a cap formed from the material of said at least one flash section fixed to the  
6 tank wall to cover the opening.

7.

1           The fuel tank of claim 6 wherein the tank wall and the cap each have an  
2 inner layer, an outer layer and a vapor barrier layer disposed between the inner and outer  
3 layers.

8.

1           The fuel tank of claim 7 wherein at least one of the inner layer and outer  
2 layers of the cap are weldable to permit the cap to be welded to the tank wall.

9.

1                   The fuel tank of claim 8 wherein the inner layer and outer layer are formed  
2   from a polyethylene.

10.

1                   A method of forming a container and cap, comprising the steps of:  
2                   providing a parison within a pair of open mold halves each defining in part  
3   a mold cavity;  
4                   closing the mold halves together;  
5                   providing a pressurized fluid into the parison within the closed mold halves  
6   to expand the parison within the mold cavity and to form and define the shape of the  
7   container;  
8                   forming at least one flash section between the mold halves;  
9                   forming at least one cap in the flash section; and  
10                  separating the cap from the flash section.

11.

1                   The method of claim 10 which also comprises the step of providing an  
2   opening in the container and sealing the cap to the container to close the opening.

12.

1           The method of claim 11 wherein the cap is welded to the tank.

13.

1           The method of claim 10 wherein the flash sections and the container are  
2   formed simultaneously.

14.

1           A cap for a polymeric fuel tank, comprising:  
2           a body formed from at least one layer of a polymeric material suitable for  
3   attachment in sealed relationship to the fuel tank and two vapor barrier layers constructed  
4   to at least restrict the permeation of fuel vapor therethrough.

15.

1           The cap of claim 14 wherein the body has at least two layers of polymeric  
2   material with the vapor barrier layers disposed between them.

16.

1           The cap of claim 14 wherein each vapor barrier layer is disposed between  
2   a pair of layers of polymeric material with at least one layer of polymeric material  
3   disposed between the vapor barrier layers.

17.

1           A blow mold, comprising:  
2           a pair of mating die halves each having a recess defining a main mold cavity  
3   when the die halves are mated in which an article is molded a second cavity defined  
4   between the mated die halves separate from the main mold cavity and in which a flash  
5   section is formed to form a cap.

18.

1           The blow mold of claim 17 wherein the second cavity is defined by  
2   cooperating recesses formed in each die half.

19.

1           The blow mold of claim 18 wherein an annular recess is defined in one die  
2   half and a generally circular recess is defined in the other die half.

20.

1           The blow mold of claim 18 wherein a generally circular recess is defined  
2   in each die half.

21.

1           The blow mold of claim 17 wherein the second cavity is defined in a gap  
2   between the die halves.

22.

- 1                   The blow mold of claim 21 which also comprises a projection carried by
- 2   one die half extending into the second cavity to define a recess in the flash.



## **ABSTRACT OF THE DISCLOSURE**

A cap is formed within the flash of a molded polymeric article. Desirably, the material of the flash, and hence the cap, has the same properties as the molded article.

In one embodiment, the molded article is a multi-layer plastic fuel tank having a vapor barrier layer sandwiched between structural and/or adhesive layers and the cap has the same general construction and may be fixed or welded to the fuel tank over an opening through the tank. Advantageously, the cap is formed in the same process used to form the molded article and reduces the scrap or waste material by utilizing a portion of the flash which is removed from the molded article after it is formed. Therefore, the cost and time to produce a molded article and one or more caps is greatly reduced.

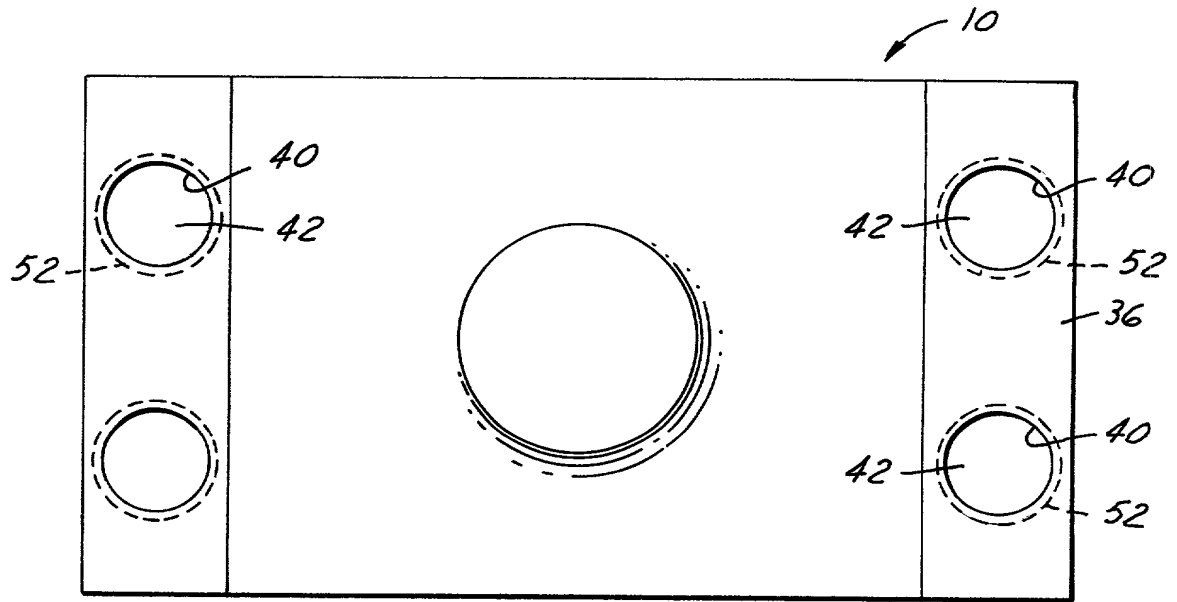


FIG. 1

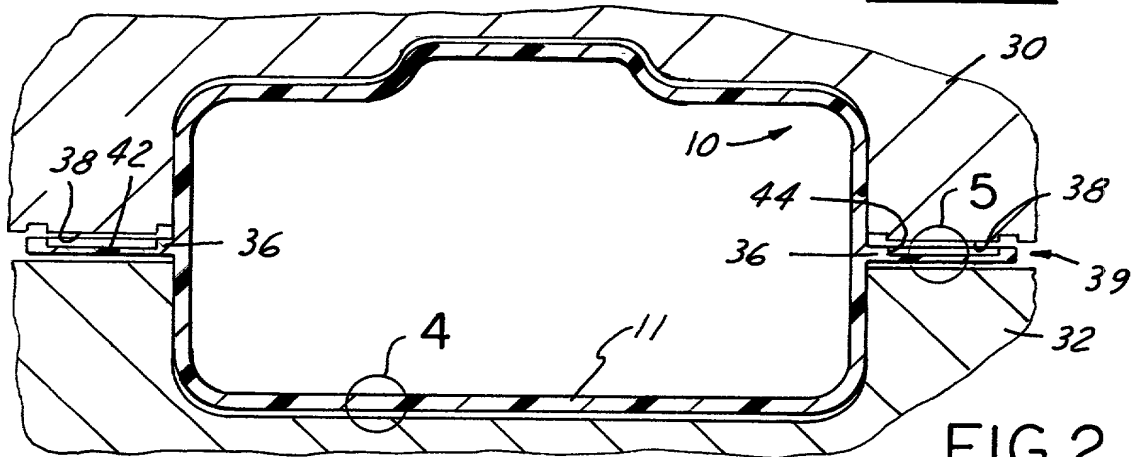


FIG. 2

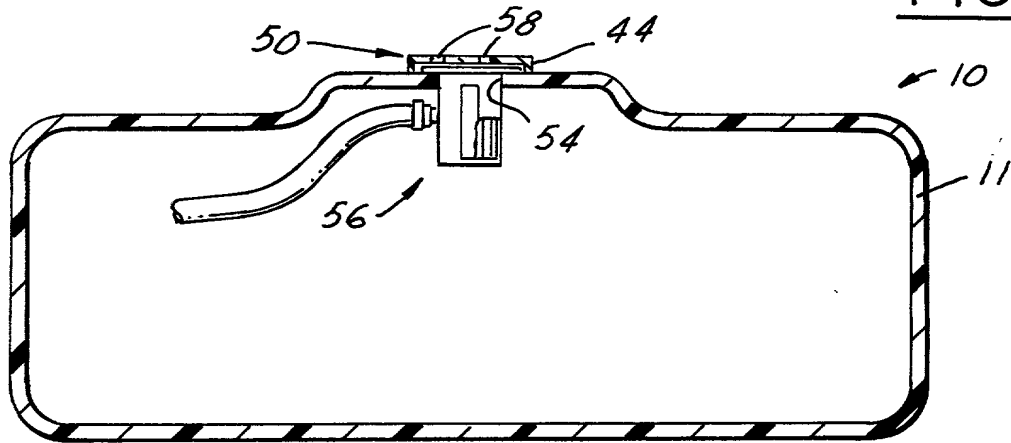


FIG. 3

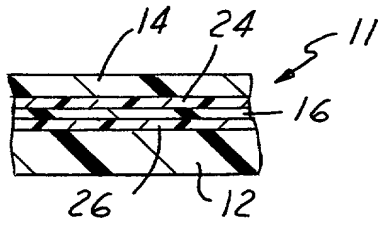


FIG. 4

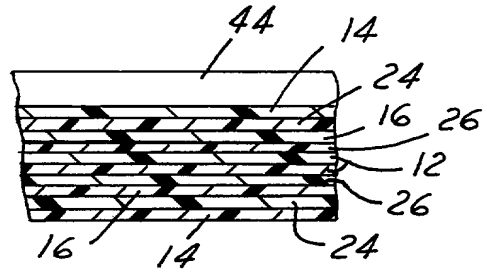


FIG. 5

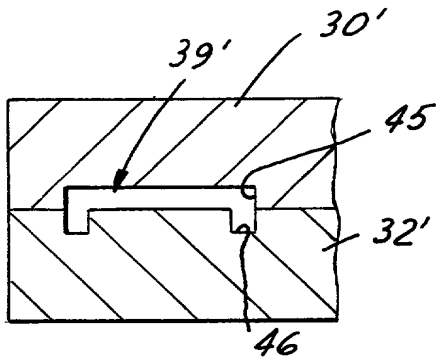


FIG. 6

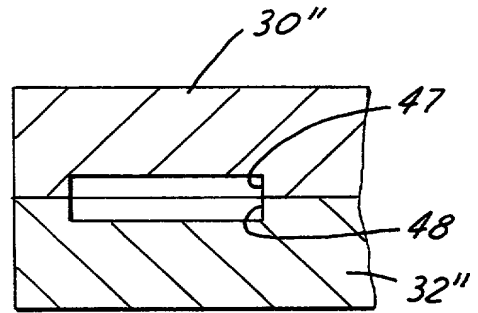


FIG. 7

**DECLARATION FOR PATENT APPLICATION**

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventors (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **MULTIPLE LAYER POLYMERIC CAP AND METHOD OF MAKING THE SAME**, the specification of which

xx is attached hereto.  
 \_\_\_\_\_ was filed on \_\_\_\_\_  
 as Application Serial No. \_\_\_\_\_  
 and was amended on \_\_\_\_\_.  
 (If Applicable)

I hereby state that we have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendments referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56, copy attached.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

**Prior Foreign Application(s)****Priority Claimed**

Number	Country	Day/Month/Year	(Yes)	(No)
Number	Country	Day/Month/Year	(Yes)	(No)
Number	Country	Day/Month/Year	(Yes)	(No)
Number	Country	Day/Month/Year	(Yes)	(No)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application Ser. No.	Filing Date	Status
Application Ser. No.	Filing Date	Status

I further declare that I do not know and do not believe that the invention claimed in this application was ever known or used by others in this country before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year prior to this application or any prior U.S. application above identified in which said invention may have been disclosed, or in public use or on sale in the United States of America for more than one year prior to this application or any prior U.S. application above identified in which said invention may have been disclosed.

#### **POWER OF ATTORNEY**

And I hereby appoint as my attorneys with full power of substitution to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith the following individual members and/or associates and/or counsel of the firm of

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Andrew M. Grove	39,697	William J. Waugaman	20,304
Richard W. Hoffmann	33,711	Charles R. White	20,494
Eric T. Jones	40,037		

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of first joint inventor Mark R. Johansen  
First Middle Last

Inventor's Signature

*Mark R. Johansen*

Date

*6/2/00*

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§1.56 Duty to disclose information material to patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) prior art cited in search reports of a foreign patent office in a counterpart application; and

(2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent or inventor.

(35 U.S.C. 6, Pub. L. 97-247)

[42 FR 5593, Jan. 28, 1977, as amended at 47 FR 21751, May 19, 1982; 48 FR 2710, Jan. 20, 1983; 49 FR 554, Jan. 4, 1984; 50 FR 5171, Feb. 6, 1985; 53 FR 47808, Nov. 28, 1988, effective Jan. 1, 1989; 57 FR 2034, January 17, 1992, effective March 6, 1992]